U.S. Department of Agriculture
Office of the Secretary

APPLYING TECHNOLOGY TO THE HUMAN PROSPECT

The prospects here are enormous and exciting, and I am pleased to be part of them.

The ascent of man -- the development and progress of human civilization -- is inextricably linked with the advance of human knowledge and its application to human needs. This underscores the very important role of universities such as the University of Wisconsin, state and federal research and extension programs, and other activities devoted to science and the progress of human knowledge. The unique partnership between the University of Wisconsin and the Forest Products Laboratory over the years exemplifies the spirit of cooperation needed to develop new knowledge and to apply it to serve human needs.

The English mathematician, William Kingdon Clifford, more than 100 years ago, expressed the role of scientific discovery in human actions. He said: "Remember then, that science is the guide of action; that the truth which it arrives at is not that which we can ideally contemplate without error, but that which we may act upon without fear; and you cannot fail to see that scientific thought is not an accompaniment or condition of human progress, but human progress itself."

We have made great use of science and technology to enhance the earth's capacity to fulfill human needs. In our lifetime, for example, science has developed new strains of wheat and other grains, and has engineered intensive forest management practices to provide human beings with an increasing supply of food and fiber.

Remarks prepared for Dr. M. Rupert Cutler, Assistant Secretary for Conservation, Research, and Education, for delivery by David G. Unger, Deputy Assistant Secretary for Conservation, Research, and Education, at the National Conference on Forest Products Utilization, Madison, Wisconsin, November 15, 1978.

We are here today because the proliferation of human numbers, human needs, and human expectations requires that we extend and apply knowledge even further. We must build not only technological systems that will add to knowledge, but also institutional systems to apply that knowledge to society's further progress. And we -- government, industry, academia, and the public -- must work together.

The Seventies represent a critical passage in our Nation's progress. We are approaching the time for difficult choices about the direction and speed of that progress. The choices before us are not simple: "growth" or "no growth." Rather, they are complex considerations of the means and direction of our progress, the manner in which it will be advanced, and the shape and quality of our future.

We are looking to scientists and engineers to enlarge the options available to us, to help guide the choices we must make, and to enhance the quality of our decisions.

This is particularly true in natural resource use and management, where the further extension, adaptation, and application of knowledge can greatly enrich our individual lives and our Nation's future.

Forest products technology has enabled us to unlock the tree, to separate its components, and to reconstitute it in a variety of forms for improved application to specific uses. Technology has broadened the uses of wood fiber, and has markedly increased the efficiency with which we use it. Here are some examples of the progress:

- o Best Opening Face Sawing (BOF) has increased the yield of material from each sawing.
- o Glu-lam technology has made laminated wood beams a viable -- and safer -- replacement for steel beams in construction.
- o The technology for the All-Weather-Wood-Foundation has made treated plywood and lumber a less costly and more easily used replacement for masonry and concrete in house construction.
- o By eliminating the need for ductwork, using less framing lumber, and using only one size of framing lumber, the truss-frame housing design can save up to $2,300 in the cost of a house.
- o And through Press-Lam and Edge-Gluing-and-Ripping technology, we have learned how to make better use of small logs, and to get as much as 30 percent more product from a log.

These are but a few of many significant technological developments in the forest products field. And the significance of this technology extends into the entire spectrum of the Department of Agriculture's natural resource responsibilities.

If 1973 demands were filled at 1948 wood utilization levels, George Weyerhaeuser estimates that 49 percent more forest land would have had to be harvested to supply the domestic U.S. market alone. That's a revealing figure. The increased efficiency of wood use -- at harvest and in the mill -- has enabled us to continue to meet both a growing demand for timber and increased demands for other uses.

We have seen a solid payoff from forest products research. Forest products technology has sought to meet increasing demands for resource uses.

I believe that forest products technology can make continuing contributions if we are willing to focus on emerging problems and opportunities with basic research necessary to address them.

- o We must maintain the importance of wood as a major renewable material.
- o We can improve the processing and use of hardwoods, tapping an underutilized resource which constitutes one-third of the nation's standing timber inventory.
- o We can develop and improve processes which make the wood-using industries more self-sufficient in energy and organic chemicals.
- o We can transcend some of the economic and technological barriers that limit our ability to recycle paper and paperboard products.
- o We can overcome some of the difficult pollution-control problems which confront the paper and paperboard industries, and improve their utilization of raw material.
- o We can modernize building codes so that new technology can be used in construction.
- o And we can continue to improve the efficiency of wood use, reduce the annual loss of wood to rot and deterioration, and improve the use of wood in construction.

These are important objectives, and they are fundamental to our evolving needs and expectations as a nation. Our pursuit of the technology to accomplish them is an important and worthwhile function -- one we must continue.

But we must also develop the institutions to adapt these technological solutions to human problems, and encourage their application to meet human needs. Albert Einstein told the California Institute of Technology that, "Concern for man himself and his fate must always form the chief interest of all technical endeavors, concern for the great unsolved problems of the organization of labor and the distribution of goods -- in order that the creations of our mind shall be a blessing and not a curse to mankind." That's an excellent charge for forest products research as well.

Technology collecting dust on shelves does us no good. We must develop the institutional systems which can adapt it -- and apply it -- to problems and opportunities.

The jargon for that is, "technology transfer" -- though it occurs in a variety of forms, and by a variety of titles.

We have a great need for technology transfer in the natural resources field -- a need for two-way communication between scientist and practitioner, between laboratory and mill. We have some <u>good</u> examples of technology transfer in forest products. But there are other areas that offer further opportunity. We have some very promising technology on our shelves which we haven't adapted to usable form. We haven't developed the markets or haven't proved or improved the economics of using it and we haven't communicated its potential application.

One of our top priorities in the Department of Agriculture is to strengthen our technology transfer institutions in the natural resource field.

We are doing this with the wholehearted support of the Congress.

Title 14 of the Food and Agriculture Act of 1977, for example, requires new Federal initiatives in agricultural research, extension, and teaching. Special emphasis is on natural resource areas, including "wood harvesting and utilization." The Act establishes forestry, including forest products technology, as a food and agricultural science. It also creates the Joint Council on Food and Agricultural Sciences, an advisory council, to review and coordinate our policies, priorities, and plans for research and extension.

This past session of Congress produced a bumper crop of new initiatives in technology transfer.

Under the Renewable Resources Extension Act of 1978, we will work with state cooperative extension services, and with colleges and universities, to provide educational programs in renewable resource management, and to identify areas where we need additional research.

The Renewable Resources Research Act of 1978 directs us to conduct research in the protection, management and utilization of forest and rangeland resources -- and to disseminate the results of that research.

And the last of this trio, the Cooperative Forestry Assistance Act of 1978, authorizes a program of technology implementation "to ensure that new technology is introduced, new information is integrated into existing technology, and forest resources research findings are promptly made available to the people who can use them."

The Congress has recognized a very great opportunity in our agriculture and natural resource programs. And it has given us the authority we need to seize the opportunity.

We are combining many of the research, extension, and education functions of the Department into a single agency -- the Science and Education Administration, or SEA.

SEA combines into one unit the once-separate functions conducted by the Agricultural Research Service, the Extension Service, the Cooperative State Research Service, and the National Agricultural Library. SEA's functions are coordinated with the research and state and private forestry functions conducted by the Forest Service; the Economics, Statistics, and Cooperatives Service; other federal agencies; the states; universities; and industry.

Under SEA we have set the framework for a strong natural resources extension program to disseminate natural resources research findings to the people who can use them. That initiative has been long overdue. We will soon appoint an Assistant Deputy Director for Natural Resources Extension to lead it.

We are pleased, too, that the Forest Service has established a technology transfer staff group, serving all Forest Service programs in research, cooperative forestry, and National Forest management. This group will give us added emphasis in forestry. It will complement our natural resource extension programs and other technology transfer initiatives.

We are also delighted with the new emphasis on research planning and applications in each of the Forest Service's laboratories and research stations.

We are building into our research processes the ability to transfer the resultant technology into practice.

There must be a constant link between perceived resource problems and opportunities, and the initiation of research to address them. And there must be scrupulous attention to the need to communicate the results of scientific research in a form which recognizes its ultimate application -- but which is nonetheless complete and accurate.

We are pleased that these important considerations are receiving attention among those who conduct research.

The various ongoing programs of the Department, the actions of Congress, and the new USDA initiatives create overlapping functions for the many agencies engaged in forestry research, cooperative forestry, and forestry extension.

We believe this overlap is healthy. It benefits our technology transfer efforts by tapping the strengths of the USDA agencies involved -- SEA, the Soil Conservation Service, the Forest Service, the Agricultural Stabilization and Conservation Service, and the Farmers Home Administration.

But coordination is necessary if we are to run our programs efficiently and with optimum effectiveness. Therefore we have formed an Interagency Agreement on Forestry to coordinate these multi-agency efforts. Several of our cooperating organizations have concurred with this multi-agency approach.

We have an interagency forestry planning committee which oversees program coordination in USDA. It ensures that Department efforts are linked, and that this coordination flows through to the state level.

We are very pleased with the agreement's provisions for technology transfer. It recognizes that a multi-agency approach is needed, that all agencies have a responsibility for providing feedback to researchers and that we need closer links between researchers and practitioners. The agreement should greatly strengthen and broaden our technology transfer effort, and improve the efficiency with which it is conducted.

I have reviewed several of the major institutions for technology transfer that we are building in the Department of Agriculture. We recognize that there are several programs within these institutions which have proven their excellence in forest products technology transfer.

The Sawmill Improvement Program is an example of effective cooperation between the research and cooperative forestry programs of the Forest Service and the Extension Service within SEA. Since 1973 this program has helped 10 percent of U.S. sawmills -- representing 24 percent of total mill capacity -- to improve their efficiency and productivity. The August Southern Lumberman estimates that this program had enabled 10 sawmills in Virginia to squeeze 10 percent more lumber out of logs than they were getting before the program.

The National Structural Flakeboard Program is another excellent example of the potential for technology transfer in forest products. There was an existing technology for making structural flakeboard from roundwood, and there was a great need to reduce the amount of residue on the National Forest and other forest lands. In 1972, when Chief McGuire committed the Forest Service to a five-year cooperative program to reduce the amount of residue on the National Forests, the Forest Service began to apply technology to need.

This cooperative program tapped the capabilities of the research, cooperative forestry, and National Forest management programs of the Forest Service; the Tennessee Valley Authority, the National Particle Board Association; several colleges and universities; and the Forest Products Research Society. The program uses programmed research funds, rather than new appropriations.

It points up the prime function of technology transfer -- to recognize a need -- and to identify the technology or additional research that tap the capabilities of several agencies and organizations.

These are just two examples of technology transfer programs in forest products. We need to build on their excellence, and the strengths of the institutions conducting them.

But let's not limit ourselves to simply expanding or building on existing programs and institutions.

We must develop new institutions to fill gaps in current technology transfer programs and to increase the efficiency or effectiveness of our technology transfer activities. This should be a major focus of the remaining sessions of this conference.

We face some very exciting and challenging prospects in the future. But we must recognize that they will take place in the context of constraints on the availability of public funds.

All government programs, including research programs, will compete for increasingly scarce dollars. Our continued ability to maintain our research programs, or to redirect other program dollars to areas where more research is needed, will require substantial improvements in our ability to evaluate our research and justify its continuation.

We must improve the payoff from our research in terms of its application to human needs and our priorities as a nation. We are here to determine how better to do that important task in the natural resource field.

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